Trend Study 13B-4-00

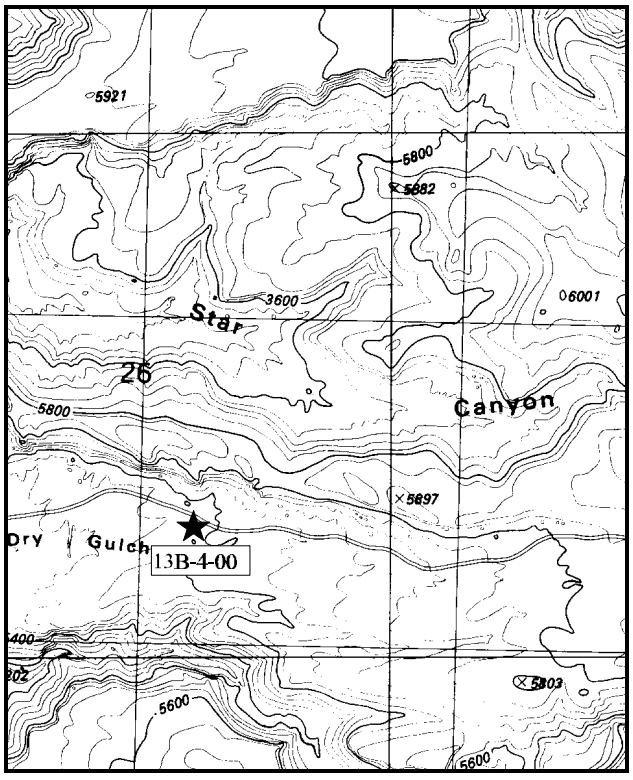
Study site name: Red Cliffs . Range type: B1ackbrush .

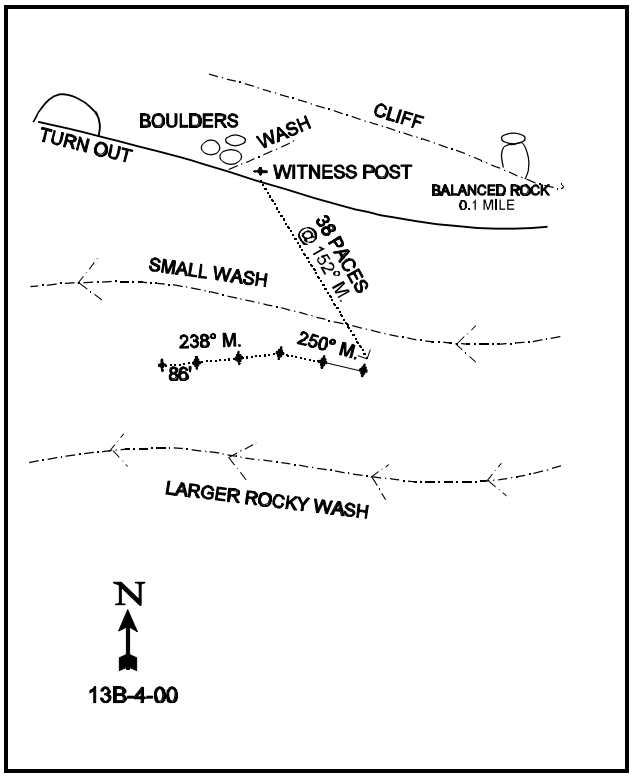
Compass bearing: frequency baseline 250°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (86ft). Belt rebar placement: belt 2@1ft, belt 3@2ft, belt 5@5ft.

LOCATION DESCRIPTION

From the Utah-Colorado state line west of Glade Park, go west 2.1 miles on the Coates Creek Road to a cattle guard. Continue on the main road 2.1 miles to a P-J area bordered on the right by large sandstone cliffs. Here you will find a witness stake (fence post) on the right (north) side of the road. The baseline starts 140 feet south (across the road) from the witness post. A short rebar, tagged #7816, marks the 0-foot end.





Map Name: Marble Canyon Diagrammatic Sketch

Township 21S , Range 25E , Section 26 UTM 4312310 N, 663114 E

DISCUSSION

Trend Study No. 13B-4 (34-4)

The Red Cliffs transect is located along the Coates Creek Road at an elevation of 5,630 feet. The area is dominated by pinyon-juniper and blackbrush. Steep orange sandstone cliffs are located just north and across the road from the site. The transect samples slightly rolling topography with exposures varying from north to south and west. Overall, the area drains to the west. There is a stock pond down the wash about one-tenth of a mile from the transect, although livestock do not appear to utilize this site. Deer and rabbit pellet groups are usually common in the area. To accommodate the increased sample size and stay within the same vegetative type, the position of the transect extension was slightly altered. A pellet-group transect run parallel to the baseline in 2000 indicated 44 deer days use/acre (18 ddu/ha), cow and elk were not sampled.

The moderately shallow soil is light orange in color and is composed of very fine particles which is loosely compacted on the surface. The soil texture is a sandy clay loam with a soil reaction that is mildly alkaline (pH 7.6). The amount of phosphorus in the soil (5.9ppm) could be a limiting factor where 10ppm is minimal for normal plant growth and development. Blackish rock and pavement is scattered throughout the site with an estimated combined cover of about 20%. More then half of the vegetative cover is contributed by blackbrush. An additional 14% of the total cover is contributed by annual grasses and forbs. Litter cover, estimated at 23% in 1995, is now down to 21%. Most of the litter is mostly beneath the crown of blackbrush. The bare soil interspaces between the blackbrush plants is protected by a few annuals, but a cryptogamic crust offers most of the cover in these interspaces. Some slight erosion, as well as pedestaling under the shrubs, was noted in 1995 and 2000.

The key browse species on this site is blackbrush which provided 50% of the vegetative cover in 1995, and currently contributes 58% of the total vegetative cover. Age class structure has changed little since 1986. This is a mature population (93-94%) with few young (2-3%) or decadent plants (4-5%). There were no seedlings encountered in either 1986 or 1995, however a few were classified in 2000 (biotic potential of <1%). Hedging is light to moderate and plants exhibit good vigor. Four percent of the population was classified as decadent in 1995 compared to 11% in 1986. Currently (‘00) it has gone up to only 5%. Several other browse species were present but infrequently encountered. These include: broom snakeweed, Wyoming big sagebrush, cliffrose, prickly pear cactus, spiny hopsage, and green ephedra. Point-center quarter data in 2000 estimated 33 juniper trees/acre and 8 pinyon trees/acre.

Grasses and forbs combined for 35% of the vegetative cover in 1995, but with the very dry winter and summer, they only contribute to 17% of the total vegetative cover in 2000. Of the four grasses encountered, cheatgrass provided 90% of the grass cover in 1995. At this time it has decreased to 70% of the grass cover. It is still fairly abundant and found in nearly every quadrat, 96% vs 84% quadrat frequency respectively for 1995 and 2000. The remaining grasses include: mutton bluegrass, red threeawn, and needle-and-thread grass. Perennial forbs are rarely found, with an annual *Astragalus sp*. accounting for 95% of the forb cover in 1995. Because of the very dry winter and summer, this species was not found and the forb cover is now less than 1%.

1986 APPARENT TREND ASSESSMENT

The vegetative appears stable. Because of its abundance, blackbrush is the key browse species on this critical winter range. The browse density and population characteristics represent a healthy stand that appears to be stable. The site has potential to support a diverse perennial grass component. The soil trend appears to be slightly down due to some signs of erosion. Cryptogams are especially important on this site in reducing soil loss on the north-facing slope.

1995 TREND ASSESSMENT

The soil trend appears stable at this time, but in poor condition. The interspaces between the shrubs are protected by cryptogamic crusts which hold the soil in place. Although, if these crusts are disturbed, erosion will likely be accelerated. Vegetation and litter are associated mostly with the shrubs and provide some soil cover. Blackbrush has a stable population with increased vigor and decreased decadency. Other browse species don't appear to be expanding, therefore, the browse trend is stable. Perennial species in the interspaces would be more dependable at stopping erosion. Herbaceous understory is almost exclusively annual species. There is not really a concern for destructive fires because the annual species are mostly associated with the shrub crowns, leaving the interspaces with little fuel to carry a fire. Cryptogams still provide an important protective ground cover for this blackbrush community. The decrease in perennial nested frequency and the overall lack of perennial species leads to a slightly downward herbaceous understory trend.

TREND ASSESSMENT
soil - stable (3), but only fair condition
browse - stable (3)
herbaceous understory - slightly downward (2)

2000 TREND ASSESSMENT

The soil trend appears to continue to be stable at this time, but still in poor condition. The interspaces between the shrubs are protected by cryptogamic crusts (which have increased by 25% since 1995) which help to hold the soil in place. Although, if these crusts are disturbed, erosion will likely be accelerated with high intensity summer storms. Vegetation and litter cover are associated mostly with the shrubs which provide some soil cover. Blackbrush continues to have a fairly stable population with improved vigor and stable decadency. Other browse species don't appear to be increasing, therefore the browse trend continues to be stable. Perennial species in the interspaces would be more dependable at stopping erosion, however the herbaceous understory currently provides less than 1% total cover. There is no real concern for destructive fires because the annual species are mostly associated with the shrub crowns, leaving the interspaces with little fine fuels to carry a fire. Cryptogams still provide an important protective ground cover for this blackbrush community. Currently cryptogams provide 20% cover. There is a slight increase in the sum of nested frequency of perennial grasses but nested frequency of perennial forbs remained stable. There is, however, an overall lack of perennial species on this site. Annuals make up almost 75% of the total herbaceous cover. Trend is considered stable but in poor condition.

TREND ASSESSMENT
soil - stable (3), but only fair condition
browse - stable (3)
herbaceous understory - stable (3)

HERBACEOUS TRENDS --
Herd unit 13B, Study no: 4

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'95	'00	'86	'95	'00	'95	'00
G	Aristida purpurea	3	3	6	2	2	2	.30	.06
G	Bromus tectorum (a)	-	$_{b}$336	$_{a}$264	-	96	84	4.56	2.24
G	Oryzopsis hymenoides	-	-	5	-	-	2	-	.03
G	Poa fendleriana	$_{b}$110	$_{a}$21	$_{a}$11	39	10	7	.15	.13
G	Poa secunda	$_{a}$-	$_{a}$-	$_{b}$31	-	-	14	-	.68
G	Sitanion hystrix	5	-	-	2	-	-	-	-
G	Sporobolus cryptandrus	3	-	-	1	-	-	-	-
G	Stipa comata	-	3	-	-	1	-	.03	-
G	Vulpia octoflora (a)	-	$_{a}$-	$_{b}$24	-	-	10	-	.05
Total for Annual Grasses		0	336	288	0	96	94	4.56	2.28
Total for Perennial Grasses		121	27	53	44	13	25	0.48	0.91
Total for Grasses		121	363	341	44	109	119	5.04	3.20
F	Astragalus nuttallianus (a)	$_{a}$-	$_{b}$242	$_{a}$-	-	80	-	6.36	-
F	Calochortus nuttallii	-	-	1	-	-	1	-	.00
F	Cryptantha spp.	-	2	-	-	1	-	.00	-
F	Cymopterus spp.	-	-	1	-	-	1	-	.00
F	Draba nemorosa (a)	-	$_{a}$12	$_{b}$33	-	5	17	.02	.08
F	Erodium cicutarium (a)	-	18	20	-	9	9	.19	.07
F	Erigeron spp.	-	1	-	-	1	-	.00	-
F	Gilia hutchinifolia (a)	-	14	10	-	7	4	.03	.64
F	Lappula occidentalis (a)	-	3	-	-	2	-	.01	-
F	Lepidium perfoliatum	$_{a}$-	$_{b}$12	$_{a}$-	-	5	-	.02	-
F	Machaeranthera glabriusculas	3	-	-	1	-	-	-	-
F	Mentzelia spp.	$_{a}$-	$_{a}$-	$_{b}$20	-	-	7	-	.03
F	Navarretia intertexta (a)	-	$_{a}$-	$_{b}$7	-	-	3	-	.01
F	Phlox longifolia	$_{a}$-	$_{b}$9	$_{a}$-	-	3	-	.04	-
F	Plantago patagonica (a)	-	$_{b}$8	$_{a}$-	-	3	-	.01	-
F	Schoencrambe linifolia	-	1	-	-	1	-	.00	-
F	Unknown forb-annual (a)	-	2	-	-	1	-	.00	-
Total for Annual Forbs		0	299	70	0	107	33	6.64	0.81
Total for Perennial Forbs		3	25	22	1	11	9	.09	0.04
Total for Forbs		3	324	92	1	118	42	6.73	0.86

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 13B, Study no: 4

Type	Species	Strip Frequency '95	Strip Frequency '00	Average Cover % '95	Average Cover % '00
B	Artemisia tridentata wyomingensis	2	0	-	.84
B	Chrysothamnus nauseosus albicaulis	2	5	-	-
B	Coleogyne ramosissima	0	0	16.70	13.51
B	Ephedra viridis	81	72	-	-
B	Grayia spinosa	0	1	-	.38
B	Gutierrezia sarothrae	0	1	.04	.15
B	Juniperus osteosperma	3	2	4.65	4.22
B	Opuntia spp.	1	0	.03	.15
B	Pinus edulis	2	5	.38	-
B	Sclerocactus	0	11	-	.06
Total for Browse		91	97	21.80	19.30

CANOPY COVER --
Herd unit 13B, Study no: 4

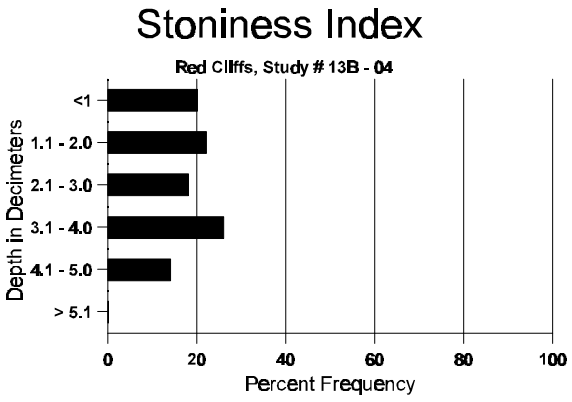
Species	Percent Cover '00
Juniperus osteosperma	3

BASIC COVER --
Herd unit 13B, Study no: 4

Cover Type	Nested Frequency '95	Nested Frequency '00	Average Cover % '86	Average Cover % '95	Average Cover % '00
Vegetation	360	300	13.75	33.59	24.73
Rock	201	188	16.25	11.28	13.46
Pavement	49	221	3.00	.08	6.66
Litter	375	331	25.00	23.32	20.85
Cryptogams	275	266	23.50	15.57	20.23
Bare Ground	297	327	18.50	25.61	30.77

SOIL ANALYSIS DATA --
Herd Unit 13B, Study # 4, Study Name: Red Cliffs

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
13.81	58.6 (13.46)	7.6	60.0	19.4	20.6	0.7	5.8	147.2	0.5



PELLET GROUP FREQUENCY --
Herd unit 13B, Study no: 4

Type	Quadrat Frequency	
	'95	'00
Rabbit	23	11
Deer	34	29

Pellet Transect	
Pellet Groups per Acre	Days Use per Acre (ha)
00	00
122	N/A
566	44 (108)

BROWSE CHARACTERISTICS --
Herd unit 13B, Study no: 4

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata wyomingensis																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	1	-	-	-	-	-	-	-	1	-	-	-	20	26	41	1
	00	1	1	2	-	-	-	-	-	-	4	-	-	-	80	27	44	4
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'95	50%	00%	00%	+60%
'00	20%	40%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'86	0	Dec:		0%
'95	40			50%
'00	100			0%

Chrysothamnus nauseosus hololeucus																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	15	42	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'95	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			
'86	0	Dec:	-
'95	0		-
'00	0		-

Chrysothamnus viscidiflorus stenophyllus																		
D	86	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'95	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			
'86	133	Dec:	100%
'95	0		0%
'00	0		0%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Coleogyne ramosissima																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	86	6	-	-	-	-	-	-	-	-	6	-	-	-	400			6
	95	5	1	-	-	-	-	-	-	-	6	-	-	-	120			6
	00	3	-	-	1	-	-	-	-	-	4	-	-	-	80			4
M	86	22	33	2	82	5	-	-	-	-	130	-	14	-	9600	15	16	144
	95	138	41	4	28	3	-	-	-	-	214	-	-	-	4280	16	30	214
	00	13	6	-	161	20	-	-	-	-	200	-	-	-	4000	15	26	200
D	86	3	5	6	1	3	-	-	-	-	13	-	5	-	1200			18
	95	6	-	-	2	-	-	-	-	-	5	-	1	2	160			8
	00	6	-	-	4	-	-	-	-	-	7	-	-	3	200			10
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	60			3
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	120			6

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	27%	05%	11%	-59%
'95	20%	02%	01%	- 6%
'00	12%	00%	01%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	11200	Dec:	11%
	'95	4560		4%
	'00	4280		5%

Ephedra viridis

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	26	33	0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20	26	43	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'95	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	0	Dec:	-
	'95	0		-
	'00	20		-

Grayia spinosa

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	-	-	-	1	-	-	-	-	-	1	-	-	-	20	23	59	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'95	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	0	Dec:	-
	'95	0		-
	'00	20		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Gutierrezia sarothrae																		
M	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66	10	5	1
	95	5	-	-	-	-	-	-	-	-	5	-	-	-	100	10	12	5
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40	7	13	2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	+34%
'95	00%	00%	00%	-60%
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	66	Dec:	-
	'95	100		-
	'00	40		-

Juniperus osteosperma																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	1	-	-	-	-	-	1	-	-	2	-	-	-	40	22	48	2
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'95	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	0	Dec:	-
	'95	0		-
	'00	60		-

Opuntia spp.																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	2	-	-	-	-	-	-	-	-	2	-	-	-	40	5	26	2
	00	11	-	-	-	-	-	-	-	-	11	-	-	-	220	5	23	11

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'95	00%	00%	00%	+82%
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	0	Dec:	-
	'95	40		-
	'00	220		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Sclerocactus																		
M	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66	7	3	1
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	4	3	1
	00	8	-	-	5	-	-	-	-	-	13	-	-	-	260	5	3	13

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'86	00%	00%	00%
'95	00%	00%	00%
'00	00%	00%	00%

%Change

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	66	Dec:	-
	'95	20		-
	'00	260		-